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COOLEY, CHARLES E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/809,210	FREUDE ET AL.	
	Examiner	Art Unit	
	Charles E. Cooley	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *49* is/are allowed.

6)☒ Claim(s) *1-3,11,15,19,20,26,28,29,36,38-41 and 48* is/are rejected.

7)☒ Claim(s) *4-10,12-14,16-18,21-25,27,30-35,37 and 42-47* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

FINAL OFFICE ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 11, 15, 20, 26, 28, 29, 36, 39, 40, and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Herfeld (US 4,781,468).

The patent to Herfeld '468 discloses a method and a system comprising a portable tank 1 having a mixer 9 mounted in the tank, the mixer comprising a coupling having a first portion 25 attached to a shaft 10 for driving the mixer; and a fixed docking station 2 adapted to receive the portable tank in an engaged configuration and to have no connection to the portable tank in a disengaged configuration, the docking station comprising a mixer drive 12 having a second portion 11 of the coupling for mating with the first portion 25; wherein the mixer comprises a bottom-mount mixer (see the orientation of Figure 2); a latch mechanism 22, 22a, 22b for preventing relative motion between the portable tank and the docking station with the system in the engaged configuration with a release mechanism (col. 5, lines 1-12); wherein the portable tank comprises one or more components 15 for facilitating engagement of the portable tank with the docking station; the docking station comprises a cantilevered structure (Figs. 1-2); a support frame 3 for connection to the portable tank; one or more components 15 for facilitating and/or maintaining

engagement of the portable tank with the docking station; the method disclosed at col. 4, line 54 through col. 5, line 23.

More specifically and for completeness, the patent to Herfeld '468 discloses a mixing apparatus wherein the hub of the mixing tool and the motor drive shaft can be connected to one another and released from one another relatively quickly by a coupling arrangement of relatively simple construction and the first vessel part is also covered in its transport state by the second vessel part (together with the mixing tool). Therefore an extremely quick change of the whole mixing vessel on the stationary mounting is possible, so that mixing apparatus constructed according to the invention can be equipped with any number of mixing vessels (each consisting of a first and second mixing vessel and appertaining mixing tool). This means, in other words, that by contrast with the known mixing apparatus described earlier, in the construction according to the invention each complete mixing vessel (consisting of a first and second vessel part) has its own mixing tool and the first vessel part which is constructed in the form of a transportable vessel can be covered by the second vessel part outside the stationary mounting in each phase. This results in a number of considerable advantages. When a change of product is necessary it is only necessary to take another complete mixing vessel. Thus, any expenditure on cleaning (such as is necessary in the known mixing apparatus) of the second vessel part and the mixing tool can be omitted. The drive unit, consisting of the drive motor and the pivot means, does not come into contact with the product and can be of similar construction for all mixing vessels. Since the first vessel part, which is supplied with a product charge, is covered by the second

mixing vessel part in almost all operating phases of the mixing vessel, in practice no impurities or other influences on the mixing constituents occur from outside during transport, mixing, storage and emptying. Even when in a construction according to the invention each mixing vessel is equipped with its own second vessel part and its own mixing tool. The slight increase in construction cost is more than compensated for by the advantages which can be achieved. This is particularly evident where a relatively frequent change of product is necessary. In previously known mixing apparatus considerable cleaning work would have to be carried out on the second vessel part and the mixing tool.

The apparatus contains a mixing vessel 1 and a stationary mounting 2 having a supporting frame 3 which can be pivoted about a horizontal shaft 4 by at least 180 degrees. The mixing vessel 1 consists essentially of two vessel parts 5 and 6 which can be connected to one another, of which the first vessel part 5 is constructed in the form of an upright transport vessel and can be moved on a wagon 7. Since in this construction--as will be explained in greater detail below--the second vessel part 6 is arranged so as to be fixed but removable in the form of a cover on the first vessel part 5, the whole mixing vessel 1 can be moved on the wagon 7.

When the mixing vessel 1 has been moved in the necessary manner in the direction of arrow 8 in FIG. 1 so that it is below the supporting frame 3 of the stationary mounting 2, an appropriate lifting device L moves the mixing vessel 1 upwards towards the supporting frame 3, so that the supporting frame 3 and the mixing vessel 1 can be connected to one another in such a way that the mixing vessel 1 is carried by the

supporting frame. From this starting position is which the mixing vessel 1 is suspended approximately vertically below the supporting frame 3 the mixing vessel can be pivoted by the pivot movement of the supporting frame 3 about the shaft 4 by approximately 180 degrees so that the mixing vessel 1 then takes up the mixing position illustrated in FIG. 2.

The second vessel part 6 can be constructed in a cup shape, or preferably and more simply in the form of a cover plate (as will be explained in greater detail below with the aid of FIG. 3), and a mixing tool 9 of known construction (for example in the form of mixing blades) is rotatably mounted on the second vessel part 6. As can be seen from FIG. 1, the hub 10 of the mixing tool 9 projects somewhat beyond the upper face of the second vessel part 6. In the starting position according to FIG. 1 the end 11 of the drive shaft of a drive motor 12, which is carried approximately centrally by the supporting frame 3 and is pivotable with the latter, projects approximately vertically downwards and can be releasably coupled to the hub of the mixing tool 10.

In an enlarged partial sectional view, FIG. 3 shows in greater detail the releasable connection of the second vessel part 6 to the upper open end of the first vessel part 5 on the one hand and to the supporting frame 3 and the end 11 of the drive shaft of the drive motor 12 on the other hand.

As regards the construction of the second vessel part 6, this can be seen clearly from FIG. 3 as having an essentially flat cover plate 13 with an outer peripheral flange 13a which is releasably connected to an upper flange ring 15 of the first vessel part 5 (for example by screws 14 which are indicated by dot-dash lines). The cover plate 13

also has a central bearing bore 16 in which sealing and bearing bushes 17 are arranged for a sealed rotatable mounting of the hub 10 of the mixing tool. Details of the exact construction of this rotary mounting have been omitted for the sake of simplicity since they are known per se). The hub 10 carries the mixing tool 9 which --as already indicated--can be a plurality of mixing blades distributed around the periphery of the hub.

As can be seen from FIG. 3, the supporting frame 3 is made up essentially of an upper carrier plate 18, an outer cylindrical carrier ring 19, and an inner cylindrical centering ring 20 which is directed towards the second vessel part 6 and the cover plate 13. The centering ring 20 comes into engagement with a spigot 21 projecting towards the supporting frame 3. The spigot 21, which is integral with the cover plate 13, encloses the bearing bore 16 and is constructed so as to taper slightly towards the top to engage and center in the end of the centering ring 20 which is directed towards it when the supporting frame 3 and the mixing vessel 1 are connected to one another.

The free end of the outer carrier ring 19 of the supporting frame 3 butts against the outer peripheral flange 13a of the cover plate 13 and has a plurality of clamping shoes 22 distributed over the external periphery. These clamping shoes 22 can be of known construction (and are therefore not explained in greater detail) and when the connection between the supporting frame 3 and the mixing vessel 1 is produced their lower ends 22a engage under the flange ring 15 of the first vessel part 5 and thereby produce a firm but releasable connection between the carrier ring and the mixing vessel. The upper ends 22b of the clamping shoes are connected to a drive which is not

shown in greater detail in order to rotate the clamping shoes 22 about their longitudinal axis.

As has already been explained, the supporting frame 3 carries the drive motor 12 approximately centrally (on its carrier plate 18) and--as shown in FIG. 3--the drive motor is fixed concentrically with the centering ring 20 in such a way that in the assembled state the end 11 of the drive shaft of this drive motor 12 and the axis of the hub 10 lie on a common axis 23 which at the same time forms the vertical axis of the mixing vessel 1.

When the mixing vessel 1 is being connected to the supporting frame 3 the hub 10 of the mixing tool should also be coupled to the end 11 of the drive shaft, which can be done in any suitable manner using coupling means which are known per se. An exemplary drive connection which can be produced particularly simply and quickly between the end 11 of the shaft and the hub 10 of the mixing tool is produced by a clamping cone connection containing a clamping cone 24 which is constructed on the end 11 of the drive shaft and tapers towards the hub 10 and a central conical bore 25 in the hub 10 which widens towards the clamping cone 24. Thus in the known construction when the supporting frame 3 is connected to the mixing vessel 1 the hub 10 is simultaneously coupled reliably and accurately to the end 11 of the drive shaft of the drive motor 12, aided by the centering ring 20 and the spigot 21.

Whilst the closing force between the supporting frame 3 and the mixing vessel 1 is sufficient for coupling together the hub 10 of the mixing tool and the end 11 of the drive shaft, when this drive connection is uncoupled it can be advantageous to exert a lift-off force on the cover plate 13 of the second vessel part 6 from the side of the

supporting frame in order to release the hub 10 with its conical bore 25 from the clamping cone 24 at the end 11 of the drive shaft. For this purpose a release mechanism which is equipped with at least one but preferably at least two push rods 26 and acts against the upper face of the cover plate 13 of the second vessel part 6 is provided on the supporting frame 3; the push rods 26 can be constructed in any suitable manner, but push rods which are connected to the piston rod of a cylinder-piston unit which is operated by a pressure medium and work quickly and reliably are preferred.

On the end of the hub 10 of the mixing tool which projects out of the second vessel part 6 over the spigot 21 of the cover plate 13 a setting ring 27 can also be provided which surrounds the said end of the hub and acts with its underside (FIG. 3) against the upper ends of the sealing and bearing bushes 17 in the cover plate 13. When the end 11 of the drive shaft and the hub 10 of the mixing tool are coupled together the mixing vessel 1 with the mixing tool 9 must be pushed against the drive shaft, i.e. the conical bore 25 is pushed onto the clamping cone 24, in order to obtain a force-locking connection. Here an abutment is produced by the setting ring 27 pushing against the upper face of the cover plate 13. In order that this force-locking clamping cone connection can be maintained particularly reliably after the supporting frame 3 with the mixing vessel 1 has been pivoted into its mixing position (FIG. 2), additional screws or bolts, indicated by dash-dot lines 20a, for adjusting the extent that the shaft 11 extends into the bore 25 can be provided in the region of the centering ring 20 and spigot 21.

Handles 28 can also be fixed on the setting ring 27 so that it is possible to turn the hub 10 and with it the mixing tool 9 from the outside in case of need (i.e. particularly when filling the mixing vessel 1) in order to distribute the material evenly in the mixing vessel 1 at the top.

The mixing process can be carried out in a manner which is known per se using this mixing apparatus. For this purpose the mixing vessel 1 is filled with a product charge in a suitable manner outside the stationary mounting 2, which can be achieved by lifting off the second vessel part 6 which is positioned uppermost and--after filling it with the charge--immediately closing the apparatus again with this second vessel part 6. However, it is even simpler to use the central conical bore 25 of the hub 10 of the mixing tool as a charging opening for the mixing vessel 1, and this bore can also be covered by a simple cover during the transport or storage of the mixing vessel 1. For the mixing operation the mixing vessel 1 is brought to the stationary mounting and is connected to the supporting frame 3 by being raised or by lowering of the supporting frame, and at the same time a force-locking coupling between the mixing tool 9 and the drive motor 12 is produced (by means of the clamping cone connection described above). The supporting frame 3 together with the mixing vessel 1 then pivots out of this starting position by approximately 180 degrees (about the axis 4) into the mixing position shown in FIG. 2. After mixing has been carried out the assembly consisting of the supporting frame 3 and the mixing vessel 1 pivots back into the starting position in which the mixing vessel 1 is released from the supporting frame 3 in the reverse sequence.

It goes without saying that other constructions can be used for the coupling means, such as for example a claw coupling, screw coupling, bayonet catch or the like.

By means of the construction of the mixing apparatus described above the mixing vessel 1 can be changed on the supporting frame 3 particularly simply and thus a very quick change of product can be carried out, and practically no cleaning is necessary for the second vessel part and the mixing tool. This mixing apparatus can be used particularly advantageously in the dye, pharmaceutical, plastic processing and food industries.

3. Claims 1, 2, 3, 11, 15, 19, 20, 26, 28, 29, 36, 38, 39, 40, and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Desai (US 6,331,070).

The patent to Desai '070 discloses a method and a system comprising a portable tank 10 having a mixer 30 mounted in the tank (Fig. 10), the mixer comprising a coupling having a first portion 34 attached to a shaft 32 for driving the mixer; and a fixed docking station 18 adapted to receive the portable tank in an engaged configuration and to have no connection to the portable tank in a disengaged configuration, the docking station comprising a mixer drive 60 having a second portion 52 of the coupling for mating with the first portion 34; wherein the mixer comprises a bottom-mount mixer (see the orientations of Figures 5-6); a latch mechanism 37-39 for preventing relative motion between the portable tank and the docking station with the system in the engaged configuration with a release mechanism (col. 5, lines 19-21);

wherein the portable tank comprises one or more components 24 for facilitating engagement of the portable tank with the docking station; the docking station comprises a cantilevered structure (Figs. 1-4); a support frame 14 for connection to the portable tank; one or more components 24 for facilitating and/or maintaining engagement of the portable tank with the docking station; the coupling may be a magnetic coupling (col. 4, lines 15-18); a plurality of portable tanks may be supplied (col. 3, lines 36-39); the method disclosed at col. 4, line 36 through col. 5, line 24.

More specifically and for completeness, the patent to Desai '070 in FIGS. 1, 7 and 8 comprises a portable mixing vessel 10. Preferably, a plurality of mixing vessels 10 having substantially interchangeable dimensions are available. As a representative shape, the vessel 10 may include a funneled lower section 20 and a bottom discharge opening that is controlled by a butterfly valve 27. The vessel opening 21 through which mixture materials are loaded into the vessel is rimmed by a clamping lip 24. A base plate or flange 29 may support the vessel in an upright position for interface with a transport device.

This particular example of the invention relies upon a hand cart 12 for transport mobility of the vessel 10 from a prior station at which the vessel may be charged with mixture materials and to a subsequent station at which the completed mixture is discharged. It is also preferable to have a plurality of such hand carts available for transport of respective vessels as a progressive flow stream. The several hand carts 12 should have substantially uniform construction features and dimensions to provide a

substantially uniform dimension between the floor 13 or other primary support surface and the vessel opening rim 25.

Those skilled in the art will understand that mixing vessels 10 may be of an infinite variety of shapes. A valved bottom discharge is an optional feature of the preferred combination. Although structural independence of the vessel 10 and hand cart 12 is preferred, there is no particular impediment to an integrated construction. Furthermore, the vessel 10 may be transported to and from the vessel closure assembly 14 by numerous other means such as a conveyor belt or an industrial fork-lift truck.

The vessel closure assembly 14 is shown in greatest detail by FIG. 7 to include an inner liner 35 supported by outer jacket 36. The jacket and liner assembly is secured to a closure mount swing plate 40. Optionally, the jacket/liner relationship may be constructed to circulate steam or chilled water depending on a desired heat environment for the mixing process. The swing plate 40 is pivotally attached to a translation plate 42 by means of a hinge 44. Rotation of the swing plate 40 about the axis of hinge 44 is controlled by a rack and pinion rotary drive 46. Vertical translation of the translation plate 42 and hence, the swing plate 40, driven by hydraulic translation struts 48.

Dynamic elements of the closure 14 include a driven spindle 32 that is rotatively confined by bearings. Along the length of the spindle 32 proximate of the closure seal lip 33 is a mixing blade assembly 30. To the outer end of the spindle 32 is a driven face coupling 34. Preferably, the coupling may be a self-aligning tooth coupling. Clearly, however, other coupling types such as magnetic couplings may be used. Around the

closure jacket 36 are a plurality of rotating disc wedges 37 for engaging the underside of the vessel 10 clamp flange 24. The discs 37 are secured to clamp spindles 38. The clamp spindles are secured in respective journal bosses that are secured to the outer jacket 36. Linear actuators 39 acting through bellcranks attached to the clamp spindles 38 rotate the disc wedges 37 into a compressive engagement with the vessel clamp flange 24 to secure the vessel 10 to the closure 14 as a unit.

The power base 18 supports a suitable prime mover 60 such as an electric motor. The motor output shaft carries a belt drive sheave 56. Conveniently lateral of the motor 60, a spindle housing 51 is secured to an upper face of the power base housing. The housing 51 confines a rotary drive spindle 50 having opposite implement ends. The lower spindle 50 end carries a driven sheave 54 that is linked to the drive sheave by a cleated power belt 58.

Procedurally, the process aspect of the invention begins with charging the vessel 10, usually through the top opening. Those materials that are to be mixed or agitated are deposited into the vessel 10 through the opening circumscribed by the vessel rim 25. Such charging may occur at the mixing station adjacent to the power base or at a remote location. For purposes of the present description, it will be assumed that the mixture ingredients were charged into the vessel 10 at a remote location and that the charged vessel was carried on the hand cart 12 to the operational station illustrated by FIGS. 1-6.

Initially, the translation struts 48 are extended to lift the translation plate 42 to an upper limit. The swing plate 40 is folded out by the rack and pinion rotational drive 46

about the axis of hinge 44 to position the closure 14 above an alignment space for vessel 10. The upper limit of the translation plate 42 resultantly places the closure seal lip 33 above the vessel opening rim 25 by a prescribed clearance space 26.

With respect to FIG. 2 the translation struts 48 are retracted to lower the closure rim 33 physically against the vessel opening rim 25. Here, a plurality of clamp actuators 39 are engaged to rotate respective disc wedges 37 under the lower lip of the vessel clamp flange 24 thereby unitizing the vessel 10 with the closure assembly 14. Depending on the particular application for the invention, it may be desirable to engage fluid-tight seals between the closure rim 33 and the vessel rim 25. Reliance upon fluid tight seals usually requires, in addition, an internal volume vent for the volume confined within the closure 14 and vessel 10 unit.

FIG. 3 illustrates another extension of the translation struts 48 to lift the vessel base plate 29 above the structure of hand cart 12 by a clearance space 28 that is sufficient to permit rotation the vessel/closure unit about the axis of hinge 44. FIG. 4 shows the vessel/closure unit at an intermediate rotational position about the hinge 44 axis. As shown by FIG. 5, the vessel/closure unit rotation is complete with a contiguous lapping of the swing plate 40 against the translation plate 42. Here, the respective rotational axes of spindles 32 and 50 are coaxially aligned. However, the translation struts 48 are extended so the driving and driven coupling faces 52 and 34, respectively, are disengaged by a separation distance 49.

Finally, the translation struts 48 are again retracted to lower the driven coupling face 34 into torque transmitting engagement with the drive coupling face 52. Here, the

rotational power of motor 60 is engaged to drive the mixing blades 30 through the material that has been transferred by gravity from the base volume 20 of the vessel 10 onto and around the mixing blades.

At the conclusion of the mixing interval, the foregoing sequence is reversed and the released vessel 10 is returned to the original hand cart 12 support position as shown by FIG. 1. The optional butterfly valve 22 is useful for a convenient gravity discharge of the mixed material from the vessel 10 into a below-floor receptacle not shown.

In the alternative embodiment of the invention illustrated by FIG. 9, the mixer blade drive spindle comprises two or more coaxial spindles 70 and 72 respective to independent drive motors and trains. The outer drive spindle 70 is secured to the outer co-axial mixing blade 62 whereas the inner co-axial mixing blade 64 is secured to the inner drive spindle 72. Each spindle 70 and 72 may be driven by respective motors, transmissions and couplings. Consequently, each blade 62 and 64 may be driven at a respective speed and direction.

4. Claims 1, 2, 15, 19, 20, 26, 28, 36, 40, and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Walker et al. (US 5,865,538).

The patent to Walker et al. discloses a method and a system comprising a portable tank 710 having a mixer 730 mounted in the tank, the mixer comprising a coupling 740 having a first portion 750 attached to a shaft 732 for driving the mixer; and a fixed docking station 120, 400 adapted to receive the portable tank in an engaged

configuration and to have no connection to the portable tank in a disengaged configuration, the docking station comprising a mixer drive 500 having a second portion 530 of the coupling for mating with the first portion 2750; wherein the mixer comprises a bottom-mount mixer; wherein the portable tank comprises one or more guide rail components 762, 764 for facilitating engagement of the portable tank with the docking station; the docking station comprises a cantilevered structure (Fig. 3A); a support frame 300 for connection to the portable tank; one or more components 762, 764 for facilitating and/or maintaining engagement of the portable tank with the docking station; plurality of portable tanks may be supplied (col. 1, lines 4-10); a flange 550 defining a funnel-like passageway 554 leading to the first portion of the coupling for facilitating mating the second portion of the coupling to the first portion (Figs. 5-7); the method disclosed at col. 6, line 30 through col. 7, line 51.

More specifically and for completeness, the patent to Walker et al. relates generally to mixing and more particularly to a method and apparatus for mixing in which mixing containers holding the material to be mixed and the mixing impeller are releasably coupleable to a mixing drive station and in which the material is mixed in the container by rotation about the impeller about one axis of rotation while the entire container is rotated about another axis of rotation. This type of mixer is commonly referred to as a containerized batch mixer with multiple axes of rotation. Containerized batch mixers are especially useful for mixing particulate matter with or without the addition of liquids.

The containerized batch mixer of the invention has a docking assembly consisting of a movable docking arm and a fixed docking arm, a rigid drive coupling and a circumferential guide collar for placing the container and the rigid drive coupling in proper axial alignment. One set of the docking arms of the invention contains forks to engage hollow rails on the mixing container. The forks on the docking arms also contain guide pins which pass through holes in the rails to further align the container and the rigid drive coupling. A rigid drive coupling is surrounded by a concentric collar that guides the container spear point into axial alignment with the drive socket, forms an axial stop to define the upper, operating position of the container in appropriate relative axial position with the drive socket, and serves as an upper contact point for clamping engagement of the container between the upper and lower docking arms. The spear point and drive socket have mating drive teeth that ensure rotational alignment and engagement of the drive coupling and the spear point. The movable docking arm is driven by a screw-jack. The use of the above-described configuration eliminates the need for a redundant, uniquely located, locking pin arrangement when the mixing container is placed in an operating position.

A mixing station embodying the principles of the invention is illustrated in FIGS. 3A-B. Mixing station 100 includes a base 110, a horizontal drive assembly 120, and a docking assembly 140. Horizontal drive assembly 120 rotates docking assembly 140 about horizontal rotation axis 132 with a drive motor 124 rotating horizontal shaft 130.

Docking assembly 140 includes a vertical support 200, an upper docking arm 300, a lower docking arm 400, an impeller drive assembly 500 and a docking arm drive

assembly 600. Vertical support 200 is a generally rectangular box structure with left rail 210, right rail 220, lower cross member 230, middle cross member 240 and upper cross member 250. Middle cross member 240 extends rearwardly from the rear face of vertical support 200, and is coupled to the end of horizontal shaft 130. Left and right lower docking arm bearing ways 212, 222 are mounted to the front faces of the left and right rails 210, 220, respectively.

Upper docking arm 300 projects forwardly from the upper end of vertical support 200, and is generally U-shaped, with a horizontal, planar main body 310 and with left flange 312 and right flange 314 projecting downwardly from the left and right sides, respectively, of main body 310, and tapering upwardly from rear to front. An annular drive mount 320 is formed in the central portion of main body 310. Annular drive mount 320 consists of a reinforcing plate welded in place to provide increased structural rigidity to the portion where the drive assembly 500 is mounted (see FIG. 6).

As shown in FIGS. 5 and 6, impeller drive assembly 500 and guide stop collar assembly 540 are mounted to opposite sides of drive mount 320. Impeller drive assembly 500 includes impeller drive motor 510, impeller drive shaft 520, and impeller drive coupling 530. As shown in FIGS. 12A and 12B, drive coupling 530 includes a drive socket 531 and a retaining collar 539 (see FIG. 6), which is fixed to the lower end of drive shaft 520. Drive socket 531 is generally cylindrical and annular, with a central bore 538, and has a series of ridges 532 and indentations 534 disposed about the periphery of its lower end. Ridges 532 include a vertically-oriented drive face 532A and angled alignment faces 532B. Internally threaded fastener bore 536 penetrates the outer

surface of socket 531 radially inwardly. Socket 531 is mounted in collar 539 by engagement of a suitable fastener (in the disclosed embodiment, a set screw) with fastener bore 536. Drive socket 531 and drive shaft 520 are coaxially aligned with, and define, a vertical drive rotation axis 522.

Guide stop collar assembly 540 is mounted to the lower side of drive mount 320 concentrically about drive coupling 530 and includes a guide stop collar body 541, guide ring 550, two stop pads 560 and two guide ring retainers 570. Guide stop collar body 541 is generally cylindrical, with an upper end 542, cylindrical side wall 543 with front and rear openings 544A, 544B therethrough, and a lower end 545. Lower end 545 is formed with a thicker wall than the remainder of guide stop collar 540, and includes a stepped internal bore with a large diameter bore portion 546, a small diameter bore portion 547, and a horizontal shoulder 548 separating the bore portions. Front and rear retainer bores 549A, 549B, respectively, radially penetrate lower end 545 and open into small diameter bore portion 547 and are internally threaded.

As shown in FIG. 7, guide ring 550 is an annular, cylindrical body with an upper end 552, lower end 553, outer cylindrical surface 551 with a peripheral retention groove 556, a tapered inner bore with a lower, tapered bore portion 554 and an upper, cylindrical bore portion 555. Guide ring 550 is mounted in small diameter bore portion 547 of with its upper end disposed adjacent shoulder 548, and is retained in guide stop collar 540 by engagement of guide retainers 570 with retention groove 556. In the disclosed embodiment, guide retainers 570 are externally threaded set screws which

are threaded into retainer bores 549A, 549B. Guide ring 550 is preferably formed from a wear resistant material such as nylon.

As shown in FIG. 8, stop pads 560 are arcuate and planar, and formed with a pair of fastener holds. In the disclosed embodiment, stop pads 560 are mounted to the bottom of guide stop collar 540 by screws, but can be attached by any suitable connector, preferably removably. Stop pads 560 are preferably formed from a wear resistant material such as nylon.

Returning to FIGS. 3A-3C, lower docking arm 400 includes a body portion 410 and left fork 420 and right fork 430 projecting forwardly from the lower front portion of body portion 410. Body portion 410 includes a generally planar vertical portion 412, a horizontal flange 414 and screw coupling collar 416 centrally mounted in horizontal flange 414. Four rollers 418A, 418B, 418C, and 418D are mounted to the rear face of vertical portion 412 for rolling engagement with bearing ways 212, 222.

Right fork 430 includes a right guide pin 432 projecting vertically upwardly from the upper surface of the fork near its distal end 431, and has a generally rectangular right stop block 434 projecting above the upper surface of right fork 430 at the fork's opposite, proximal end. Similarly, left fork 420 includes left guide pin 422 at the left fork distal end 421 and a left stop block 424.

The lower docking arm drive assembly 600 includes a motor 610, a gear coupling 620 and screw shaft 630. Screw shaft 630 passes through, and threadedly engages, screw coupling collar 416, and is rotatably seated at its lower end in screwjournal 232.

Rotation of screw shaft 630 by motor 610 via gear coupling 620 translates lower docking arm 400 vertically.

The components of the docking assembly are preferably made from carbon steel, but may be constructed of any other suitable material.

The mixing container assembly 700 and its operative engagement with mixer 100 is illustrated with reference to FIGS. 4, 9, 10A, 10B and 11A-B. As shown in FIG. 9, mixing container assembly 700 includes container body 710, lid assembly 720, impeller 730, coupling 740, spear point 750, and support frame 760.

Container body 710 has a cylindrical upper portion 712 and a frustoconical lower portion 714. It is supported at the lower portion 714 by support frame 760, which includes left and right container rails 762 and 764 respectively, vertical support posts 766 coupled at their lower ends to the upper surfaces of rails 762 and 764 and at their upper ends to container body 710. Four casters 768 are mounted to the lower surfaces of rails 762 and 764. Left and right guide holes 763 and 765, respectively, are formed in the upper surfaces of the rails and are dimensioned to receive the left and right guide pins 422 and 432 of the lower docking arms.

As shown in FIGS. 9 and 10A, lid assembly 720 has a generally planar, disk-shaped lid plate 721 that is releasably coupled at its perimeter to the upper end of container body 710 by conventional clamps or other suitable connectors. Lid assembly 720 also includes an impeller support assembly 723, which supports the impeller 730 for rotation in suitable, conventional bearings, and includes a cylindrical bearing block 722, which projects upwardly above the upper surface 724 of lid plate 721.

As shown in FIG. 10B, impeller 730 is of conventional design, and includes an impeller shaft 732 and mixing blades 734 projecting radially outwardly from shaft 732. Shaft 732 is journaled at its upper end in support assembly 723. Coupling 740 is fixed to the upper end of shaft 732 and includes lower plate 752 (attached to shaft 732), retainer collar 736, and elastomeric coupler 742, which couples lower plate 752 to retainer collar 736 and serves to reduce the transmission of shock loads on the impeller to the spear point (and thence to the impeller drive).

Spear point 750 (shown in detail in FIG. 11A) has a cylindrical lower portion 757, a shoulder portion 753 formed with a series of ridges, an upper cylindrical portion 759, and a conical vertex portion 758. Internally threaded fastener bore 756 penetrates the outer surface of lower portion 757 radially inwardly. The profile of the ridges 754 and indentations 755 is shown in FIG. 11B. Ridges 754 include a vertically-oriented drive face 754A and angled alignment faces 754B. Spear point 750 is mounted in retainer collar 736 by engagement of a suitable fastener (in the disclosed embodiment, a set screw) with fastener bore 756. Spear point 750 and impeller shaft 732 are coaxially aligned with, and define, an impeller axis of rotation 733.

Spear point 750 and drive socket 531 (see FIG. 12A) are configured to mesh together to transmit torque from the impeller drive shaft 520 to the impeller shaft 732 by engagement of the respective drive faces 532A and 754A. If the spear point and drive socket are brought together axially in a rotational orientation in which the drive faces are not rotationally aligned, alignment faces 532B and 754B engage and urge the spear point and drive socket into the correct relative rotational orientation.

The container assembly components are preferably made from a corrosion resistant and non-reactive material such as stainless steel. The elastomeric coupler 742 is preferably made from natural rubber or other suitable elastomer. Spear point 750 and drive socket 530 are preferably made from case-hardened carbon steel.

The operation of the containerized batch mixer is described with reference to FIGS. 4 and 13A-E. Mixer container 700 is loaded with particulate material and lid assembly 720 is locked in place. The container is then rolled into place in the mixing station (as shown in FIGS. 4 and 13C) with left and right forks 420 and 430 of the lower docking arm 400 disposed within left and right container rails 762 and 764 of the container assembly 700, and with the rear ends of the container rails abutting left and right stop blocks 424 and 434. In this initial position, left and right guide pins 422 and 432 are positioned below left and right guide holes (763, 765) in the container rails, and the container is disposed with the impeller axis of rotation 733 approximately aligned with impeller drive axis of rotation 522. The docking arm drive 600 is then activated to start the lower docking arm on its upward path. Screw 630 turns and the lower docking arm rises. Left and right guide pins 422 and 432 engage the left and right guide holes (763, 765), bringing the axes of rotation 522 and 733 into somewhat closer alignment.

As the lower docking arm rises further, coupler 740 and spear point 750 enter the tapered bore portion 554 of guide stop collar 540 (see FIGS. 13A and 13D). Any remaining axial misalignment of axes of rotation 522 and 733 is corrected by engagement of the upper corner of bearing block 722 with tapered bore portion 554 and the ensuing close radial engagement of the outer surface of bearing block 722 with the

inner surface of upper bore portion 555 of guide ring 550. The bearing block slides axially within upper bore portion 555 as the lower docking arm rises further, and the vertex 758 of spear point 750 enters central bore 538 of drive socket 531 and, if there is rotational misalignment between spear point 750 and drive socket 531, the alignment faces 532B and 754B engage and urge the spear point and drive socket into the correct relative rotational orientation.

The lower docking arm's vertical translation is arrested by engagement of the lower surface of stop pads 560 with the upper surface 724 of container lid plate 721. In this upper, operating position 806 of the container, the spear point and drive socket are operably engaged (see FIGS. 13B and 13E). Openings 544A-B allow visual inspection of the engagement. In the operating position, the container is clamped between the upper and lower docking arms by engagement of the upper surfaces of the forks with the upper inside surfaces of the rails and by engagement of the stop pads with the container lid plate. Shifting of the container within the docking assembly 140 is inhibited both by frictional forces between the stop pad and plate lid and between the forks and rails, and by radial bearing forces of the bearing block against the guide ring.

During operation, the docking assembly 140 is rotated about horizontal rotation axis 132 by motor 120 while the impeller with mixing blades within container 700 is rotated about the vertical axis of rotation 522 by drive motor 510.

The forks, guide pins, and guide stop collar of the invention provide reliable, accurate axial alignment of spear point 750 and drive socket 531 in the operating position of the container. Engagement of the guide stop collar with the container lid also

provides for precise axial positioning of the spear point within the drive socket. These alignment accuracies allow the drive coupling 530 to be rigid (rather than spring-mounted as in the prior art systems), which permits greater power transmission. Furthermore, the screw jack system for the lower docking arm drive is mechanically simpler while at least as safe as the prior art hydraulic lift systems. The forks and screw drive components are readily available from commercial sources and are less expensive to purchase or manufacture than the prior art docking arms and drives.

Although in the illustrated embodiment the upper docking arm is fixed and the lower docking arm is moveable, it is contemplated that the upper docking arm could move downwardly to engage the lid of the container, which could be placed on a fixed lower docking arm. Further, although it is preferred to combine the features of the forked lower docking arm with positioning pins, screw jack docking arm drive, and guide stop collar, these features offer advantages individually over the prior art, and may be used individually with prior art counterparts to the other features. The guiding and stopping/clamping functions of the guide stop collar can also be separated from each other, so that a guide collar could be used to ensure alignment of the impeller rotation and impeller drive rotation axes while using conventional structural arrangements to clampingly engage the upper end of the container with the upper docking arm. The invention can also be used in the context of a prior art system in which the impeller axis of rotation is angled, rather than vertical.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 19, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herfeld (US 4,781,468) in view of Desai (US 6,331,070).

Herfeld '468 teaches that other forms of drive couplings could be implemented (col. 3, lines 61-65 and col. 5, lines 13-15) but does not disclose the magnetic coupling or the plurality of tanks. The patent to Desai '070 discloses a system comprising a portable tank 10 having a mixer 30 mounted in the tank (Fig. 10), the mixer comprising a coupling having a first portion 34 attached to a shaft 32 for driving the mixer; and a fixed docking station 18 adapted to receive the portable tank in an engaged configuration and to have no connection to the portable tank in a disengaged configuration, the docking station comprising a mixer drive 60 having a second portion 52 of the coupling for mating with the first portion 34; wherein the mixer comprises a bottom-mount mixer (see the orientations of Figures 5-6); a latch mechanism 37-39 for preventing relative motion between the portable tank and the docking station with the system in the engaged configuration with a release mechanism (col. 5, lines 19-21); wherein the portable tank comprises one or more components 24 for facilitating engagement of the portable tank with the docking station; the docking station comprises a cantilevered structure (Figs. 1-4); a support frame 14 for connection to the portable

tank; one or more components 24 for facilitating and/or maintaining engagement of the portable tank with the docking station; the coupling may be a magnetic coupling (col. 4, lines 15-18); and a plurality of portable tanks may be supplied. In view of the explicit suggestion in Herfeld that a wide variety of drive couplings can be used, it would have been obvious to one having ordinary skill in the art, at the time applicant's invention was made, to have substituted the coupling of Herfeld with a magnetic coupling as suggested by Desai for the purpose of providing a non-contacting type coupling between the drive and tank, for sanitary reasons. Furthermore, to provide Herfeld with a plurality of tanks as suggested by Desai would have been obvious for the purpose of facilitating the batch mixing of the contents of a multitude of tanks and since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

7. Claims 3 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (US 5,865,538) in view of Desai (US 6,331,070).

Walker et al. does not disclose the magnetic coupling. The patent to Desai '070 discloses a system comprising a portable tank 10 having a mixer 30 mounted in the tank (Fig. 10), the mixer comprising a coupling having a first portion 34 attached to a shaft 32 for driving the mixer; and a fixed docking station 18 adapted to receive the portable tank in an engaged configuration and to have no connection to the portable tank in a disengaged configuration, the docking station comprising a mixer drive 60 having a second portion 52 of the coupling for mating with the first portion 34; wherein

the mixer comprises a bottom-mount mixer (see the orientations of Figures 5-6); a latch mechanism 37-39 for preventing relative motion between the portable tank and the docking station with the system in the engaged configuration with a release mechanism (col. 5, lines 19-21); wherein the portable tank comprises one or more components 24 for facilitating engagement of the portable tank with the docking station; the docking station comprises a cantilevered structure (Figs. 1-4); a support frame 14 for connection to the portable tank; one or more components 24 for facilitating and/or maintaining engagement of the portable tank with the docking station; the coupling may be a magnetic coupling (col. 4, lines 15-18); and a plurality of portable tanks may be supplied. It would have been obvious to one having ordinary skill in the art, at the time applicant's invention was made, to have substituted the coupling of Walker et al. with a magnetic coupling as suggested by Desai for the purpose of providing a non-contacting type coupling between the drive and tank, for sanitary reasons.

Allowable Subject Matter

8. Claims 4-10, 12-14, 16-18, 21-25, 27, 30-35, 37, and 42-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claim 49 is allowable over the prior art of record.

Response to Amendment

10. Applicant's arguments with respect to the pending claims have been considered but are deemed to be moot in view of the new grounds of rejection necessitated by amendment. The amendments to the claims mandated a renewed and divergent field of search (as evidenced by the cited prior art herein) that uncovered fixed docking stations for blending materials in portable tanks.

With regard to the new rejections, Applicant is reminded that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Turning to the rejection of the claims under 35 U.S.C. § 102(b), it is noted that the terminology in a pending application's claims is to be given its broadest reasonable interpretation (*In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)) and limitations from a pending application's specification will not be read into the claims (*Sjolund v. Musland*, 847 F.2d 1573, 1581-82, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988)). Anticipation under 35 U.S.C. § 102(b) is established only when a single prior art reference discloses, either expressly or under the principles of inherency, each and

every element of a claimed invention. *See Constant v. Advanced Micro-Devices. Inc.*, 848 F.2d 1560, 1570, 7 USPQ2d 1057, 1064 (Fed. Cir.), cert. denied, 488 U.S. 892 (1988); *RCA Corp. v. Applied Digital Data Sys., Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). Moreover, anticipation by a prior art reference does not require either the inventive concept of the claimed subject matter or the recognition of properties that are inherently possessed by the prior art reference. *Verdegaal Brothers Inc. v. Union Oil co. of California*, 814 F.2d 628, 633, 2 USPQ2d 1051, 1054 (Fed. Cir. 1987), cert. denied, 484 U.S. 827 (1987). A prior art reference anticipates the subject matter of a claim when that reference discloses each and every element set forth in the claim (*In re Paulsen*, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994) and *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990)); however, the law of anticipation does not require that the reference teach what Applicant is claiming, but only that the claims "read on" something disclosed in the reference. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984) (and overruled in part on another issue), *SRI Intel v. Matsushita Elec. Corp. Of Am.*, 775 F.2d 1107, 1118, 227 USPQ 577, 583 (Fed. Cir. 1985). Also, a reference anticipates a claim if it discloses the claimed invention such that a skilled artisan could take its teachings in combination with his own knowledge of the particular art and be in possession of the invention. See *In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995), cert. denied, 116 S.Ct. 1362 (1996), quoting from *In re LeGrice*, 301 F.2d 929, 936, 133 USPQ 365, 372 (CCPA 1962).

With respect to the applied prior art under 35 U.S.C. § 102(b), the examiner has explicitly demonstrated how the references disclose each and every element set forth in the claims and how the pending claims read on the disclosures of the references, hence the rejections are considered proper.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The cited prior art discloses fixed docking stations for blending materials in portable tanks adapted to dock with and be released from the docking station.

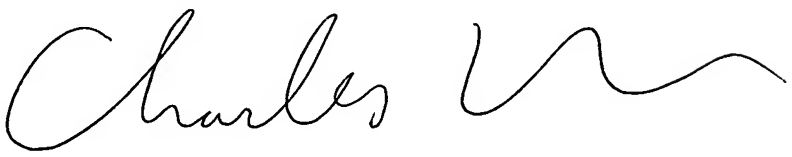
12. Applicant's amendment necessitated the new grounds of rejection. Accordingly, **THIS ACTION IS MADE FINAL.** See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY

PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION. ANY RESPONSE FILED AFTER THE MAILING DATE OF THIS FINAL REJECTION WILL BE SUBJECT TO THE PROVISIONS OF MPEP 714.12 AND 714.13.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Cooley whose telephone number is (571) 272-1139. The examiner can normally be reached on Mon-Fri. All official facsimiles should be transmitted to the centralized fax receiving number 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Charles E. Cooley
Primary Examiner
Art Unit 1723

3 May 2006